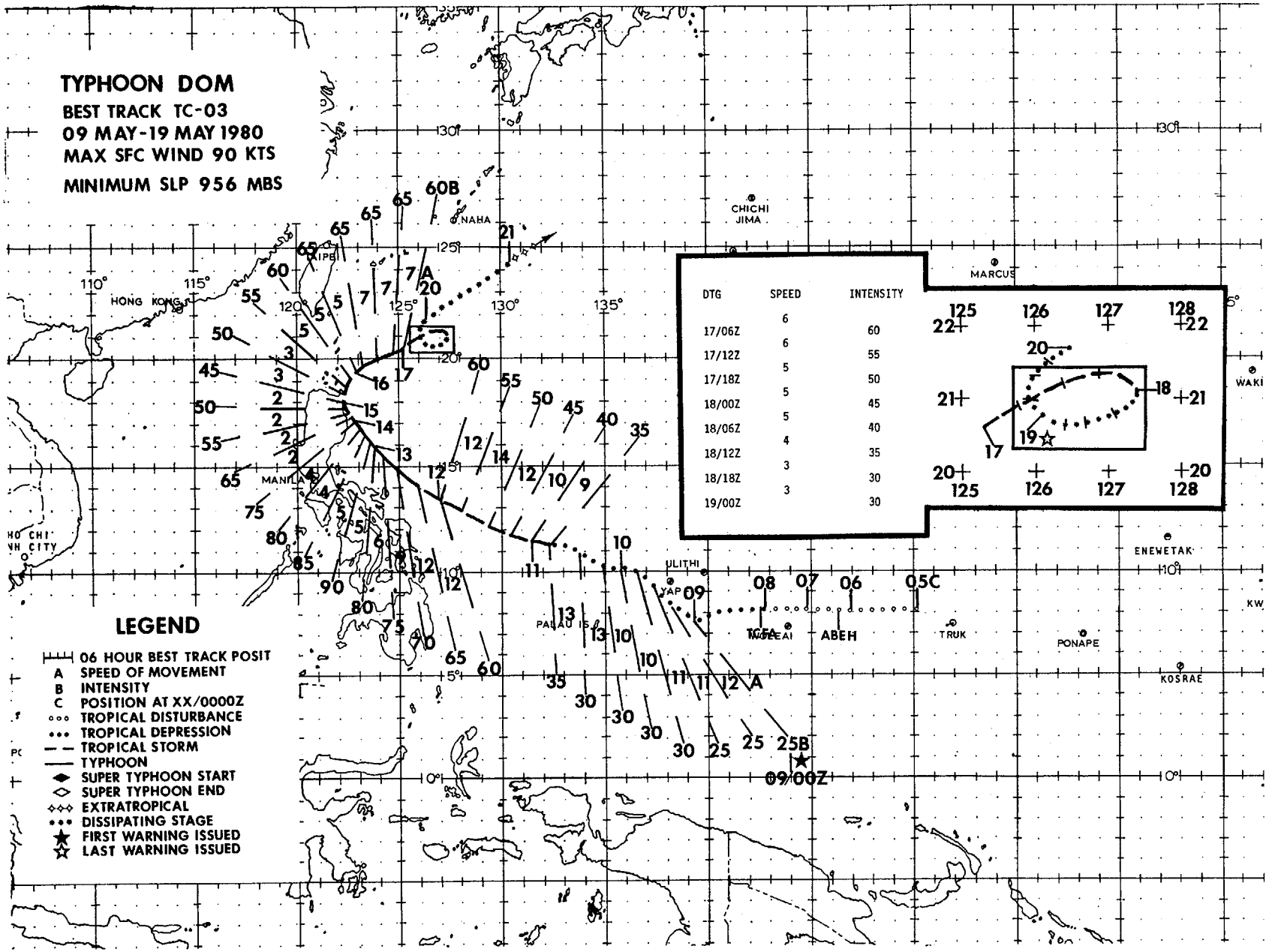
TYPHOON DOM
BEST TRACK TC-03
09 MAY-19 MAY 1980
MAX SFC WIND 90 KTS
MINIMUM SLP 956 MBS
DTG SPEED INTENSITY
17/06Z 6 60
17/12Z 6 55
17/18Z 5 50
18/00Z 5 45
18/06Z 5 40
18/12Z 4 35
18/18Z 3 30
19/00Z 3 30
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
09/00Z
HONG KONG
MANILA
NAHA
CHICHI JIMA
MARCUS
WAKE
ENEWETAK
ULITHI
YAP
TRUK
PONAPE
KOSRAE
ABEH
110°
115°
120°
125°
130°
135°

Dom was the first tropical cyclone that developed to typhoon intensity in the western North Pacific in 1980. Dom had several features of interest: a pronounced tilt in the vertical axis during the developing stages and the execution of a rare anticyclonic loop in the later stages of his existence.

Satellite imagery showed a weak disturbance which first appeared along the near equatorial trough on 5 May. The disturbance showed no significant development as it tracked across the Caroline Islands during the following three days. The first investigation by reconnaissance aircraft was scheduled on 8 May when a significant increase in convective activity was noted. The weak circulation located by the aircraft prompted JTWC to issue a Tropical Cyclone Formation Alert for an area south of Guam. By the 9th, satellite imagery indicated strong outflow on the west side of the circulation and increased organization of convective cloud elements became evident as the disturbance continued to develop. As the circulation became more organized, reconnaissance aircraft observed an increase in the surrounding surface winds. The first warning on TD03 was issued at 090000Z.

Little change in intensity occurred during the next two days, during which time the 700 mb circulation was displaced as much as 77 nm (143 km) west-southwest of the surface center. This displacement was indicative of marked vertical shear caused by strong mid- to upper-level easterly flow.

Vertical shear remained strong during Dom's early stages of development as he moved westward steered by strong mid- to upper-level easterlies along the southern periphery of the mid-level subtropical ridge axis. On 10 May, a mid-tropospheric low pressure center developed over the Asia Mainland, causing the ridge to recede eastward. This created a weakness in the ridge near the Philippines, allowing Dom to track west-northwestward away from the strong mid- to upper-level easterlies. With the decrease in vertical wind shear, Dom's axis became more vertical and development proceeded. Dom reached tropical storm intensity at 101800Z as an anticyclone with outflow in all quadrants developed at upper-levels.

A large area of low-level convergence formed to the northeast of Dom as evidenced by convective activity shown by satellite

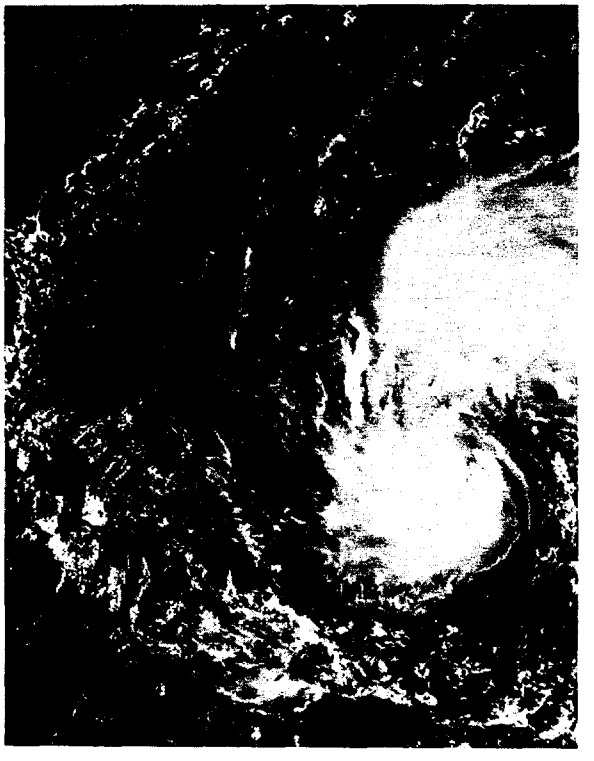

FIGURE 3-03-1. Typhoon Dom at 40 kt (21 m/sec) intensity tracking west-northwestward at 9 kt (17 km/hr), 11 May 1980, 0213Z. (DMSP visual imagery)

imagery on the 11th (Fig. 3-03-1). This are of convection dissipated as an induced ridge formed between Dom and a circulation to the southeast of Guam which would later develop into Typhoon Ellen. Dom attained typhoon intensity at 120600Z. When Dom intensified to 90 kt (46 m/sec), he had a large eye 30 nm (56 nm) in diameter and his speed of movement decreased markedly as he moved away from the strong mid- to upper-level easterly steering flow. Dom became virtually stationary as he drifted slowly toward Luzon with weakening commencing due to the decreased moisture content of the air being drawn into Dom's circulation across the mountainous terrain of Luzon. By 141200Z, Dom had weakened to tropical storm intensity and was tracking northward at 2 kts (1 m/sec) showing indications of impending recurvature.

Dom unexpectedly regained typhoon strength 24 hours after recurvature. Reintensification was made possible by a lessening of the land effect and energy provided by a tongue of warm water extending north of Luzon (Fig. 3-03-2). Dom then tracked northeastward south of the area of maximum sea surface temperature (SST). A later SST analysis (Fig. 3-03-3) showed the decrease in SST which is normally observed after the passage of a tropical cyclone. This decrease in SST is caused primarily by evaporative cooling and the mixing of surface water with cooler sub-surface water and, to a lesser extent, by the addition of rain water and the decrease in solar radiation reaching the surface (Brand, 1970). Dom's final decrease to tropical storm intensity was due to the shearing effect of strong upper-tropospheric westerlies and strong low-level easterlies. The upper-level center continued to track eastward, whereas the surface circulation began a rare anticyclonic loop as it tracked westward under the influence of the low-level easterly flow. At 190000Z, JTWC issued the final warning on Dom, although post-analysis indicated he ceased to exist as a significant tropical cyclone on the 18th.

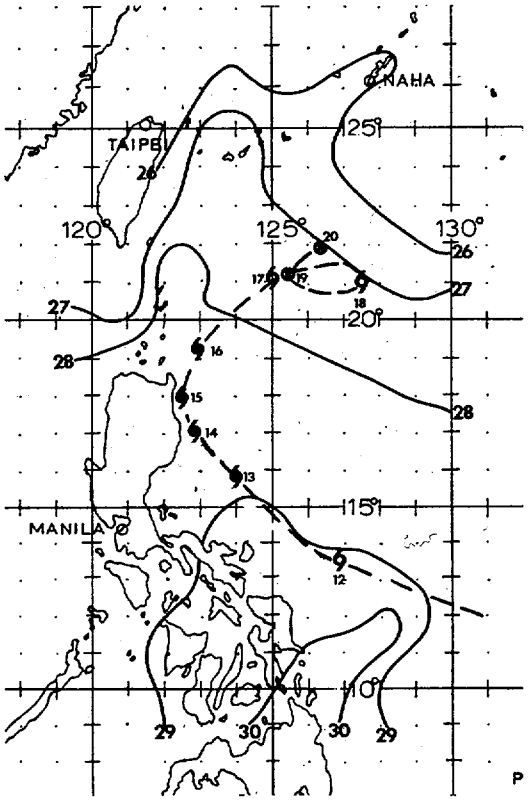

FIGURE 3-03-2. Composite sea surface temperature analysis of data from 10-16 May 1980, produced by the Oceanographic Services Division of Naval Oceanography Command Center, Guam.

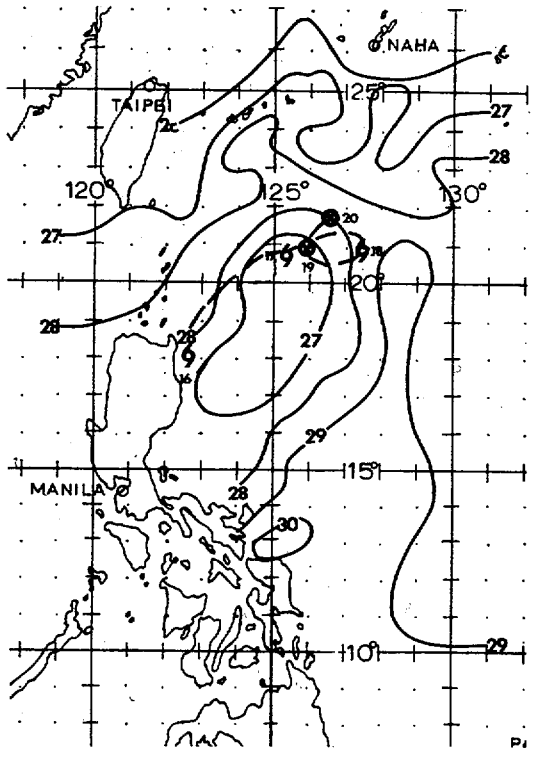

FIGURE 3-03-3. Composite sea surface temperature analysis of data from 17-23 May 1980, produced by the Oceanographic Services Division of Naval Oceanography Command Center, Guam.

Triggered by a mid-tropospheric trough which entered the South China Sea, an extratropical surface low pressure system formed south of Japan at 200000Z with the associated frontal boundary extending to the southwest of Okinawa. At this time, Typhoon Ellen was 600 nm (1113 km) east-northeast of the remnants of Dom. On the 20th, both the remnants of Dom and Typhoon Ellen accelerated toward the extratropical low along the east side of the frontal boundary. By 211200Z, the three systems had merged to form an intensifying mid-latitude storm over the east coast of central Honshu, Japan. This deepening mid-latitude storm tracked northeastward along the northern periphery of the mid-Pacific ridge.